

**Original citation:**

Yahaya, Ismail, De Leon, Antonio Ponce, Uthman, Olalekan A., Soares, Joaquim and Macassa, Gloria. (2014) Individual and community-level socioeconomic position and its association with adolescents experience of childhood sexual abuse : a multilevel analysis of six countries in Sub-Saharan Africa. Journal of Injury and Violence Research, Volume 6 (Number 1). pp. 21-26. ISSN 2008-2053

**Permanent WRAP url:**

<http://wrap.warwick.ac.uk/59118>

**Copyright and reuse:**

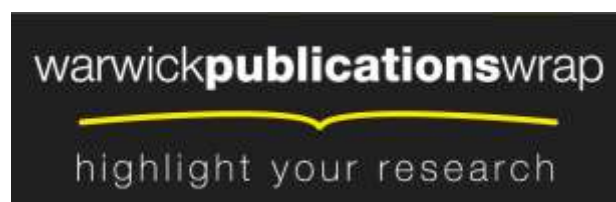
The Warwick Research Archive Portal (WRAP) makes this work of researchers of the University of Warwick available open access under the following conditions.

This article is made available under the Creative Commons Attribution 3.0 (CC BY 3.0) license and may be reused according to the conditions of the license. For more details see: <http://creativecommons.org/licenses/by/3.0/>

**A note on versions:**

The version presented in WRAP is the published version, or, version of record, and may be cited as it appears here.

For more information, please contact the WRAP Team at: [publications@warwick.ac.uk](mailto:publications@warwick.ac.uk)



<http://wrap.warwick.ac.uk>

## Original Article

# Individual and community-level socioeconomic position and its association with adolescents experience of childhood sexual abuse: a multilevel analysis of six countries in Sub-Saharan Africa

Ismail Yahaya <sup>a,b,\*</sup>, Antonio Ponce de Leon <sup>c</sup>, Olalekan A. Uthman <sup>d,e</sup>, Joaquim Soares <sup>a,c</sup>, Gloria Macassa <sup>a,c,f</sup>

<sup>a</sup> Department of Public Health Sciences, Midsweden University, Sweden.

<sup>b</sup> Centre for Evidence-Based Global Health, Nigeria.

<sup>c</sup> Division of Social Medicine, Department of Public Health Sciences, Karolinska Institute, Sweden.

<sup>d</sup> Warwick-Centre for Applied Health Research and Delivery (WCAHRD), Division of Health Sciences, Warwick Medical School, The University of Warwick, Coventry, CV4 7AL, United Kingdom.

<sup>e</sup> Liverpool School of Tropical Medicine, International Health Group, Liverpool, Merseyside, UK.

<sup>f</sup> Department of Occupational and Public Health Sciences, University of Gavle, Sweden.

## KEY WORDS

*Childhood sexual-abuse*  
*Sexual violence*  
*Sub-Saharan Africa*  
*Socio-economic-status*  
*Neighborhoods*  
*Health survey*

### Abstract:

**Background:** Childhood sexual abuse (CSA) is a substantial global health and human rights problem and consequently a growing concern in sub-Saharan Africa. We examined the association between individual and community-level socioeconomic status (SES) and the likelihood of reporting CSA.

**Methods:** We applied multiple multilevel logistic regression analysis on Demographic and Health Survey data for 6,351 female adolescents between the ages of 15 and 18 years from six countries in sub-Saharan Africa, between 2006 and 2008.

**Results:** About 70% of the reported cases of CSA were between 14 and 17 years. Zambia had the highest proportion of reported cases of CSA (5.8%). At the individual and community level, we found that there was no association between CSA and socioeconomic position. This study provides evidence that the likelihood of reporting CSA cut across all individual SES as well as all community socioeconomic strata.

**Conclusions:** We found no evidence of socioeconomic differentials in adolescents' experience of CSA, suggesting that adolescents from the six countries studied experienced CSA regardless of their individual- and community-level socioeconomic position. However, we found some evidence of geographical clustering, adolescents in the same community are subject to common contextual influences. Further studies are needed to explore possible effects of countries' political, social, economic, legal, and cultural impact on childhood sexual abuse.

© 2014 KUMS, All rights reserved

Received 2012-10-01

Accepted 2013-05-29

### \*Corresponding Author at:

Ismail Yahaya: Department of Public Health Sciences, Mid-Sweden University, Sweden. Tel: 447960724714,

Email: [ilyahaya@yahoo.com](mailto:ilyahaya@yahoo.com) (Yahaya I.).

© 2014 KUMS, All rights reserved

This is an open-access article distributed under the terms of the [Creative Commons Attribution 3.0 License](http://creativecommons.org/licenses/by/3.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## Introduction

Childhood sexual abuse (CSA) against girls (defined as sexual violence experienced by

female children below the age of 18 years) is a substantial global health and human-rights problem and a growing concern in sub-Saharan Africa.<sup>1</sup> The World Health Organisation (WHO) Global School-

based Student Health Survey (SHS) documented the widespread nature of sexual abuse in children,<sup>2</sup> with lifetime prevalence of sexual abuse among students 13–15 years of age in the five countries surveyed, ranged from 9% to 33%. In a review of population based studies, Pereda and colleagues found that 0% to 53% of women reported that they had experienced CSA.<sup>3</sup> CSA is also associated with physical, social and psychological effects on young women.<sup>4–12</sup> A troubling aspect of CSA is underreporting of cases. In SSA including the six countries in this study, most researchers believe that statistics of CSA under-represent the actual number of victims. The embarrassment, shame or fear of being blamed and a desire to keep the abuse secret make disclosure uncommon.<sup>13,14</sup> Others stay silent for fear of provoking further violence, or insensitive interventions which could make their overall situation worse.

Individual based socioeconomic position has been documented to be a contributing factor to sexual violence.<sup>15</sup> Higher socioeconomic status (SES) levels among women have generally been found to be protective factors against the risk of sexual violence towards women.<sup>15</sup> In contrast, most studies on CSA are not associated with SES. The risk factors identified for CSA in preadolescents (before 10 years) and early adolescents (10 to 14 years) include having a stepfather, living without a natural parent, having an impaired mother, poor parenting, or witnessing family conflict.<sup>10,16</sup> Such individual level factors under examination are limited in their scope and do not address how CSA is influenced by wider social structural forces. Recently, community-level factors have been the focus of attention when considering risk factors for violence. The association between area based socioeconomic indicators and health outcomes have been documented in recent studies.<sup>17,18</sup> Although the mechanisms by which area based SES affects health are not clear, it has been suggested that community SES could influence health behaviours and health related beliefs of their residents, independent of their personal SES.<sup>19,20</sup>

Strong evidence exists that contextual factors are important in determining levels of sexual violence across groups.<sup>21</sup> Studies from developing and developed countries show that community-level measures of SES have significant effects on the risk of sexual violence. Previous research has focused predominantly on other forms of sexual violence especially intimate partner violence. To date, there are no studies that have investigated the role of socioeconomic indicators and community socioeconomic conditions simultaneously on CSA in sub-Saharan Africa. Understanding social factors such as SES, which are likely fundamental causes of

health outcomes, are necessary to help adopt broad-based societal interventions that could produce substantial health benefits.<sup>22</sup> Other factors which can increase the vulnerability to sexual violence (especially due to social, economic and political crises) include wars, political strife, natural and manmade disasters, as they disrupt the formal and informal protection mechanisms of families, communities and the states. However, such factors are not dealt with in this study.

### Conceptual Framework

In this study, we drew on the elements of a socio-ecological model to examine the associations between neighbourhood factors and CSA.<sup>4,23</sup> The socio-ecological model recognizes the interwoven relationship that exists between the individual, relationship, community and societal factors.<sup>12</sup> The model explores the relationship between individual and contextual factors and considers violence as the product of multiple levels of influence on behaviour. The more homogenous the health of people within a neighbourhood is (as compared with the health of people from different neighbourhoods), the more probable it is that the determinants of individual health are directly related to the contextual environment of the neighbourhood and/or that social processes of geographical segregation are taking place.<sup>24</sup> The socio-ecological model has been used extensively to better understand violence and the effect of potential prevention strategies.<sup>25</sup> The benefit of the socio-ecological model lies in its capacity to consider, in a systematic way, the factors that influence health behaviours; in this case those factors that put people at risk of experiencing or perpetrating violence.<sup>12</sup> Community measures of poverty have been found to have the greatest explanatory power among socio-ecological theory variables.<sup>26</sup> Community poverty weakens social network and the capacity to control the behaviour of people and hence increase the likelihood of reporting CSA.<sup>27</sup>

We also adopted the concept of social control theory which postulates that individuals are inherently inclined to become deviant as their ties to the “conventional order” within society becomes or is broken.<sup>28</sup> According to the theory, strong social bond to social institutions promotes conformity to conventional norms, and hence individuals who possess weak or broken social bonds to conventional institutions are more likely to engage in deviant behaviour<sup>28</sup> in this case CSA. According to differential association theory, negative behaviour is learned through interaction with

other deviant individuals and these interactions are formed through social and cultural transmission.<sup>29</sup> Both social control theory and differential association theory show the importance of familial cohesion, parental stressors, and neighbourhood environment in the development of pro-social behaviour in deterring negative behaviour.<sup>30</sup>

To the best of our knowledge, no studies exist that have examined the contributions of individual and contextual factors associated with CSA in sub-Saharan Africa. Thus, the overarching aim of this study was to fill this research gap and contribute to the existing literature on CSA. The specific objectives were (1) to examine individual and contextual factors associated with CSA and (2) to examine whether there is significant community level variation in reported CSA; whether people living in the same community share similar probability of reporting CSA.

## Methods

The data reported here were from the Demographic and Health Surveys (DHS) conducted in six countries in sub-Saharan Africa (Ghana, Liberia, Nigeria, Uganda, Zambia and Zimbabwe) between 2006 and 2008. The six countries were chosen because they met the selection criteria of recent surveys during the past 10 years and because of the availability of data sets on sexual violence.

DHS surveys were designed to collect good quality, nationally representative data on demographic and health indicators of women and members of their households. In general, the surveys were well conducted with a high response rate (average of 96%). Methods and data collection procedures have been published elsewhere.<sup>31</sup> Briefly, the survey applied utilised a two-stage cluster sampling design. The first stage involved taking up enumeration areas from Census files while in the second stage, a sample of households was drawn from an updated list of households within each enumeration area. Every survey was stratified by urban and rural status and additionally by country-specific geographic or administrative regions. A standardised questionnaire was administered by interviewers to all the female participants aged between 15 and 49 years in the selected households. To ensure standardisation and comparability across sites and time, DHS surveys employ intense interviewer training, standardised measurement tools and techniques, identical core questionnaires and instrument pretesting.<sup>32</sup> The number of women included in the six DHS ranged from 4,916 in Ghana to 33,885 in Nigeria. The DHS survey was implemented by respective

national implementing agencies with technical assistance from ICF Macro International Inc (Calverton, MD).

## Outcome Variable

To be included in the analysis, the respondents were required to meet the following two criteria: (1) they must be eighteen years or younger and (2) they must be a permanent resident at the place where the interview was conducted. For this study, CSA was defined as sexual violence on or before the age of 18 years. To assess if participants were sexually abused in childhood, all eligible women were asked the following questions: "At any time in your life, as a child or as an adult, has anyone forced you in any way to have sexual intercourse or perform any other sexual acts?" The two possible outcomes for the questions were "yes" or "no". Respondents who answered yes were then asked questions about the age at which the abuse first occurred and the identity of the person who committed the act. Respondents who answered yes and in cases where the violence occurred when they were under the age of 18 years, were considered as suitable cases of CSA and coded as "1", while those who responded no or if the abuse occurred after the age of 18 years, formed the other group of the dichotomy and were coded "0". All the women who did not answer the question were excluded from the survey.

## Determinants Variables

### Individual Level Factors

The main independent variables of interests at the individual level were wealth status and level of education. The wealth index was constructed using easy-to-collect data on the household's ownership of selected assets, such as televisions and cars, dwelling characteristics such as flooring materials, type of drinking water sources, toilet facilities and other characteristics that are related to wealth status. They were then assigned a weight or factor score generated through principal component analysis.<sup>33</sup> The weighted scores were divided into five quintiles for the analytic models (poorest, poorer, middle, richer and richest).<sup>34</sup> The level of education of the participants was categorized into: no formal education or educated.

### Community-level Factors

Within the DHS, communities were defined as the primary sampling unit (PSU). The PSU was based on the

most recent sampling frame for each country as defined by census enumeration blocks. We included two community level factors: community SES and place of residence. Community SES was an index constructed from three variables using principal component analysis. The variables are the proportion of respondents: with no education (illiterate), unemployed and living below the poverty level (asset index below 20% poorest quintile). A standardised score with mean 0 and standard deviation 1 was generated from this index, which we divided into five quintiles (quintiles 1 to 5). Quintile 5 represented highest SEP while quintile 1 represented lowest SEP. Place of residence was categorised into either rural or urban residence.

### Control Variable

Country of residence was also included as a categorical variable. The country was included as a partial control variable to control for the effects of unknown factors due to potential differences across the six countries.

### Ethics

The surveys were approved by the ICF Macro's Ethics Committee, USA and the National Ethics Committee in the Ministry of Health of the respective countries. Informed consent was obtained from participants before the collection of all data.

### Statistical Analysis

In the descriptive statistics, frequency tabulations were conducted to describe the distribution of correspondents. The key variables were expressed as percentages. Given the hierarchical structure of the sample and the binary outcome, a logistic multilevel modelling approach was adopted. We specified a two-level model for binary response reporting CSA or not, for adolescents (level 1) living in a community (level 2).

Three models were fitted. In the first model, an empty model, no explanatory variable was included. This model was focused on decomposing total variance into its individual and community components. In the second model, only control variable was included. The third model (full model) included control, individual and neighbourhood variables.

The results of the fixed effect model (measures of association) were expressed as odds ratios (ORs) with 95% confidence intervals (CI). The results of the random-intercept models (measures of variation) were presented

as variance partition coefficient (VPC) and proportional change in variance (PCV). The VPC was calculated by the linear threshold (latent variable method) according to the formula used by Snijders <sup>35</sup> as follows:

$$VPC = \frac{V_c}{V_c + \left(\frac{\pi^2}{3}\right)}$$

where  $V_c$  = community level variance.

We calculated the PCV as follows:

$$PCV = \frac{(V_a - V_b)}{V_a} \cdot 100$$

where  $V_a$  = variance of the empty model, and  $V_b$  = variance of the model with more terms.

MLwin software, version 2.10 <sup>36</sup> was used for the analysis. The statistical significance of covariates was calculated using Wald's test. All significance tests were two-sided and statistical significance was defined at 5% level.

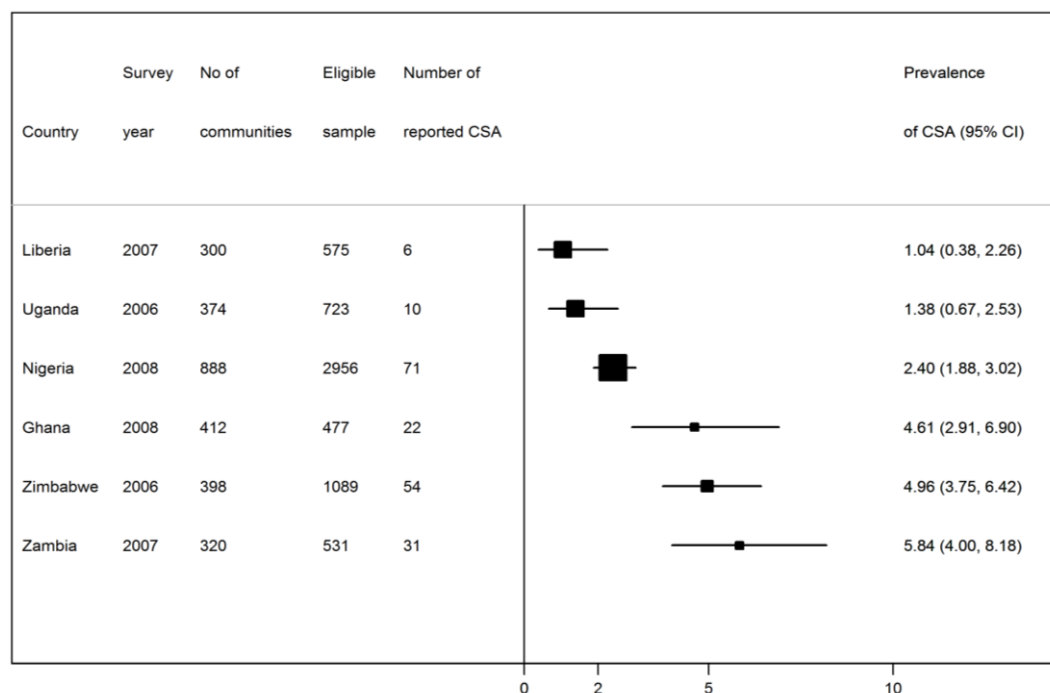
## Results

### Sample Characteristics

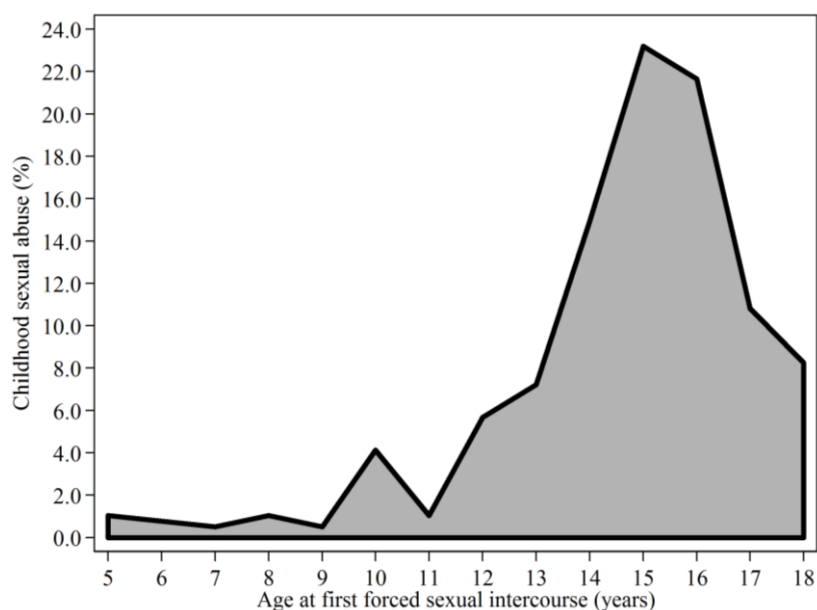
The countries, the survey year, and the eligible sample are shown in Figure 1. The number of adolescents who were permanent residents in the area at the time of the survey and thus included in the study was 477 in Ghana and 2,956 in Nigeria. The number of communities sampled ranged from as few as 300 in Liberia to as many as 888 in Nigeria. The percentage of adolescents that had experienced CSA ranged from 1.04% in Liberia to 5.84% in Zambia. The youngest age of exposure to CSA was 5 years old (Figure 2). As shown in Figure 2, the most common age at which respondents experienced CSA was between 14 and 17 years of age, with 70% of the reported cases of CSA occurring at this age group. The descriptive statistics of respondents are presented in Table 1. A total of 6,351 adolescents were analysed in this study. About one-fifth (12%) of the respondents were educated. Almost half of the respondents (46%) were sampled from Nigeria.

### Measures of Variability (random intercept models)

The result of the random-intercept model is shown in Table 2. The empty model (null model) shows that there was a significant variation in the odds of reporting CSA across the communities ( $\alpha=0.926$ ,  $p=0.036$ ). The



**Figure 1: Description of Demographic and Health Surveys data 2006-2008 in sub-Saharan Africa by country, survey year, communities sampled, eligible sample and reported childhood sexual abuse (CSA)**



**Figure 2: Age at which first forced sexual intercourse occurred, as reported by the adolescents**

intra-community correlation coefficient as implied by the intercept component variance specified that 22% of the variation in CSA could be attributed to the community level factors. As judged by a proportional change in variance, almost half (46%) of the variance in the odds of reporting CSA across communities was explained by country domain variable. After adjusting for all the

variables in the full model (Model 3), about 70% of the variance in the odds of reporting CSA across communities was explained by all the variables included. The variations across communities became not statistically significant after controlling for control-variable in Model 2 and all variables in Model 3.



Table 1: Percentage distribution of selected characteristics

Variable	Total number (%)
<b>Individual level</b>	(n=6351)
<b>Educated</b>	
Yes	763 (12.0)
No	5,588 (88.0)
<b>Wealth index</b>	
Poorest	1,257 (19.8)
Poorer	1,313 (20.7)
Middle	1,410 (22.0)
Richer	1,315 (20.7)
Richest	1,056 (16.6)
<b>Community Level</b>	
<b>Place of residence</b>	
Urban	4,481 (70.6)
Rural	1,870 (29.4)
<b>Community SES</b>	
Quintile 1	1,569 (24.7)
Quintile 2	1,451 (22.8)
Quintile 3	1,229 (19.4)
Quintile 4	1,081 (17.0)
Quintile 5	1,021 (16.1)

### Measures of Associations (fixed effects)

The results of fitting the model including control, individual and community-level variables are also displayed in Table 2. Only country dummies and level education were statistically significantly associated with CSA. Respondents with no education were 64% less likely to have reported CSA than those with formal education (odds ratio [OR] = 0.36, 95% confidence interval [CI] 0.16 to 0.81). Compared with Zambia, residents in the other five countries were less likely to have reported CSA: Ghana (OR 0.19, 95% CI 0.09 to 0.47), Liberia (OR 0.03, 95% CI 0.01 to 0.22), Nigeria (OR 0.43, 95% CI 0.28 to 0.68), Uganda (OR 0.12, 95% CI 0.05 to 0.30) and Zimbabwe (OR 0.17, 95% CI 0.09 to 0.34).

### Discussion

The present study examined the way in which individual and community level SES influenced the history of sexual abuse in childhood. The causes of CSA are many and complex, and there are numerous ideas that have been proposed to help understand this phenomenon. Research

has focussed on the effect of the family, the family environment, poverty, parental stress and other factors on CSA. The present study expands on the current literature in that it examined the way in which SES influenced the history of sexual abuse in childhood. Using the social ecological model, we hypothesised that history of CSA would be associated with community socioeconomic status (SES). The results of the present study corroborates those of previous studies on CSA that found no evidence of association between SES and history of CSA<sup>10, 37, 38</sup> and between area of residence (rural/urban) and history of CSA.<sup>39, 40</sup> CSA transcends across all SES at the individual level. More importantly, the findings uncover new evidence that risk of CSA cuts across all strata of community socioeconomic context. We found no evidence that CSA was associated with community-level SES. Though, these variables were not statistically significant, it should not imply that they are not important from public health perspective. This suggests that there may be lack of evidence of socioeconomic inequality in the occurrence of CSA; regardless of the household socioeconomic status, children had equal exposure to CSA. One possible explanation could be that we did not have large enough sample size to reach statistically significant level.

Counter intuitively, we found that uneducated women were less likely to have reported CSA. The higher prevalence of abuse reported in educated girls compared to non-educated girls was unexpected. This finding requires further investigations, as high level of education is not a common factor for CSA.<sup>37</sup> A possible contributory factor may be the high rate of reported sexual violence in African schools.<sup>13</sup> Although, most of the perpetrators of sexual abuse are either family members or those known to the victim, most cases of this maltreatment still takes place either on the way to school, in schools or on the way back from schools.<sup>1</sup>

Importantly, the results suggest that adolescents living in the same community tended to report CSA. It is possible that adolescents in the same community were subjected to common contextual influences.<sup>24</sup> However, the preponderance of the variance was explained by individual, community-level SES. Almost half of the variance in the community was explained by unmeasured country effects. Similarly, variations across communities proved to be not statistically significant after controlling for the effects of unmeasured control factors. This suggests that the likelihood of reported CSA may be due to the unmeasured country-level effects. It is possible that the community-level variance was due to shared social norms. The full model was

Table 2: Fixed- and random-intercept parts of multilevel logistic regression of childhood sexual abuse

Measures of association	Model 1 <sup>a</sup> OR (95% CI)	Model 2 <sup>b</sup> OR (95% CI)	Model 3 <sup>c</sup> OR (95% CI)
<b>Control-variable</b>			
<b>Country</b>			
Ghana		0.20 (0.08 – 0.48)***	0.20 (0.08 – 0.47)***
Liberia		0.03 (0.01 – 0.20)***	0.03 (0.01 – 0.22)**
Nigeria		0.40 (0.26 – 0.62)***	0.43 (0.28 – 0.68)***
Uganda		0.13 (0.05 – 0.32)***	0.12 (0.05 – 0.30)***
Zambia		1 (reference)	1 (reference)
Zimbabwe		0.19 (0.10 – 0.36)***	0.17 (0.09 – 0.34)***
<b>Individual-level</b>			
No education			0.36 (0.16 – 0.81)*
<b>Wealth index</b>			
Poorest			1.06 (0.46 – 2.44)
Poorer			0.84 (0.39 – 1.79)
Middle			0.83 (0.42 – 1.67)
Richer			0.88 (0.46 – 1.65)
Richest			1 (reference)
<b>Community-level</b>			
Urban (vs. rural)			0.67 (0.40 – 1.15)
<b>Community SES*</b>			
Quintile 1 (least)			1 (reference)
Quintile 2			0.96 (0.56 – 1.64)
Quintile 3			1.05 (0.59 – 1.87)
Quintile 4			1.20 (0.62 – 2.30)
Quintile 5 (most)			1.04 (0.46 – 2.33)
<b>Measures of variation</b>			
<b>Community-level</b>			
Variance (SE)	0.926 (0.442)*	0.505 (0.370)	0.274 (0.345)
ICC (%)	21.9	13.3	7.7
Explained variation (%)	reference	45.5	70.4

<sup>a</sup>Model 1 – Empty model – no explanatory variables<sup>b</sup>Model 2 – Adjusted for control variable (country as a fixed-effect)<sup>c</sup>Model 3 – Adjusted for control-, individual- and community-level factors

\*Community-SES – community socioeconomic disadvantages, quintile 1 – least disadvantaged, quintile 5 – most disadvantaged

Abbreviations: OR – odds ratio, CI – confidence intervals, SE- standard error, ICC – intra-community correlation

able to explain most of the observed variations. The findings have important implications for targeting policy as well as the exploration of factors not included in the model that could explain the remaining unexplained variation.

Although this study used socio ecological framework to examine how individual and community level SES influence CSA, it is important to highlight concerns with reporting CSA. Children born to victims of CSA are at increased risks of being risks themselves. Because these children live in a violent environment, they are at risks either at the hands of their own caregivers or from the

deleterious consequences of having a caregiver who suffers from the emotional, psychiatric or physical sequelae of her own childhood abuse.<sup>41</sup> Ayala and colleagues also points out that domestic violence increases the probability of sexual abuse within the family.<sup>42</sup> The abuse of such children in the hands of their parents has been linked to either the parents being neglectful or through recreation of environmental conditions in which abuse was allowed to persist across generations.<sup>43</sup> Such situation has led to the notion that abusing parents were themselves abused and that abused and neglected children would become tomorrow's perpe-



tors of family violence.<sup>44</sup> A vast proportion of sexual violence takes place within the victim's immediate environment with majority of the perpetrators known to the victims but yet are not reported. Most sexually abused children do not tell anyone they were abused, even when directly asked by parents or other authority figures. The stigma associated with being a victim of sexual assault makes it difficult for victims or even their parents to report suspected cases. Within a family, cases of CSA may go unreported by a spouse to avoid marital separation, divorce, loss of friends, loss of job and loss of income.<sup>45</sup> The secrecy and collusion within the family serves as a barrier for any family member to report the abuse. In addition to this, there are strong norms against informing on one's family members.<sup>46</sup>

### Study Limitations and Strengths

Despite the contribution our study makes to the existing literature on neighbourhood effects, we are aware of certain limitations. Primarily, the variables available were restricted because the data from this study was drawn from national surveys. Although we were able to construct CSA variable and utilise some socio-demographic factors, other predictors of CSA such as family stability and marital conflict, parenting and parent-child relationships and parental adjustment were not available in the survey and so could not be included in the analysis. Further, some of these variables might have explained some associations between community and CSA. In addition, almost all of the samples included in the model were from Nigeria. It is possible that the associations may be influenced by the large number of adolescents from Nigeria. However, we found that not only Nigeria's country dummy was associated with the likelihood of reporting CSA. As this is a cross sectional study, it is difficult to assess the direction of causality from its findings. Data was collected through self-report and because of the sensitive nature of the questions being asked, there is the likelihood that some respondents might not have disclosed their past experience(s). Therefore, it is unlikely that an exact account of the exposure to the CSA will be available. It is also feasible that the cases of CSA are underreported because of the stigma associated with sexual violence. Finally, our survey does not have data on household income. We utilised asset-based wealth index which is a proxy indicator of household economic status.

Despite these limitations, the strengths of the study are important. To the best of our knowledge, this is one of the first studies to examine the association between community SES and CSA applying a multilevel approach.

It is also a large, population based study from six countries in sub-Saharan Africa with high response rates. It is a nationally representative sample with similar indicators used across regions and countries, making it possible for numerical values to be compared across the sites. More so, the data obtained from DHS was widely perceived to be of high quality based on sound sampling methodology and adherence to ethical standards of data collection including violence data.<sup>32</sup> About 70 % of the community variations in the reported CSA were accounted for by individual and community contextual characteristics, signifying that the models were effective in predicting the risk of CSA. Similarly, we were able to limit and avoid cohort effect and recall bias. We included only adolescents in the model. By including only respondents aged 18 or younger, we were able to improve timeliness of information gathering, such that the interval between the event (CSA) and the interview (the recall period) is as short as possible, thus reducing non-differential recall bias. Similarly, by including only permanent residents at the time of the interview, we were able to prevent cohort effect - that is, variations in the characteristics of the community over time among respondents who are defined by some common life experience or shared temporal experience.

### Conclusion

This study provides evidence that likelihood of reporting CSA cuts across all individual SES as well as all community socioeconomic strata. Adolescents in the same community may be subjected to common contextual influences. Further studies are needed to explore possible effects of countries' political, social, economic, legal and cultural factors on CSA.

### Acknowledgments

The data used in this study were obtained from MEASURE DHS Archive and was originally collected by the ICF Macro, Calverton USA. We would like to thank ICF Macro for allowing us to use the data.

### Funding: None

**Competing interests:** The authors declare that they have no competing interests.

**Ethical approval:** The surveys were approved by the ICF Macro's Ethics Committee, USA and the National Ethics Committee in the Ministry of Health of the respective countries. Informed consent was obtained from participants before the collection of all data.

## References

1. Reza A, Breiding MJ, Gulaid J, Mercy JA, Blanton C, Mthethwa Z, et al. Sexual violence and its health consequences for female children in Swaziland: a cluster survey study. *Lancet*. 2009 Jun; 373(9679):1966-72.
2. Brown DW, Riley L, Butchart A, Meddings DR, Kann L, Harvey AP. Exposure to physical and sexual violence and adverse health behaviours in African children: results from the Global School-based Student Health Survey. *Bull World Health Organ*. 2009 Jun; 87(6):447-55.
3. Pereda N, Guilera G, Forns M, Gomez-Benito J. The international epidemiology of child sexual abuse: a continuation of Finkelhor(1994). *Child Abuse and Negl*. 2009 Jun; 33(6):331-42.
4. Bronfenbrenner U. Toward an experimental ecology of human development. *American Psychologist*. 1977 Jul; 32(7):513-31.
5. O'Leary A, Purcell D, Remien RH, Gomez C. Childhood sexual abuse and sexual transmission risk behaviour among HIV-positive men who have sex with men. *AIDS Care*. 2003 Feb; 15(1):17-26.
6. Malow R, Devieux J, Lucenko BA. History of childhood sexual abuse as a risk factor for HIV risk behavior. *Journal of Trauma Practice*. 2006; 5(3):13-32.
7. Dinwiddie S, Heath AC, Dunne MP, Bucholz KK, Madden PA, Slutske WS, et al. Early sexual abuse and lifetime psychopathology: a co-twin-control study. *Psychol Med*. 2000 Jan; 30(1):41-52.
8. Kendler KS, Bulik CM, Silberg J, Hettema JM, Myers J, Prescott CA. Childhood sexual abuse and adult psychiatric and substance use disorders in women: an epidemiological and cotwin control analysis. *Arch Gen Psychiatry*. 2000 Oct; 57(10):953-9.
9. Nelson EC, Heath AC, Madden PA, Cooper ML, Dinwiddie SH, Bucholz KK, et al. Association between self-reported childhood sexual abuse and adverse psychosocial outcomes: results from a twin study. *Arch Gen Psychiatry*. 2002 Feb; 59(2):139-45.
10. Fergusson DM, Lynskey MT, Horwood LJ. Childhood sexual abuse and psychiatric disorder in young adulthood: I. Prevalence of sexual abuse and factors associated with sexual abuse. *J Am Acad Child Adolesc Psychiatry*. 1996 Oct; 35(10):1355-64.
11. Lalor K, McElvaney R. Child sexual abuse, links to later sexual exploitation/high-risk sexual behavior, and prevention/treatment programs. *Trauma Violence Abuse*. 2010 Oct; 11(4):159-77.
12. Dahlberg LL, Krug EG, Mercy JA, Zwi AB, Lozano R. Violence- a global health problem. Switzerland: World Health Organization, 2002:1-56.
13. Jewkes R, Sen P, Garcia-Moreno C. Sexual Violence. In: Krug E, Dahlberg LL, Mercy JA, Zwi AB, Lozano R (eds). *World report on Violence and Health*. Geneva: World Health organization, 2002: 147-82.
14. Pinheiro PS. *World report on violence against children*. Geneva: ATAR RotoPresse SA, 2006.
15. Jewkes R. Intimate partner violence: causes and prevention. *Lancet*. 2002 Apr 20; 359(9315):1423-9.
16. Finkelhor D. Epidemiological factors in the clinical identification of child sexual abuse. *Child Abuse Negl*. 1993 Jan-Feb; 17(1):67-70.
17. Pickett KE, Pearl M. Multilevel analyses of neighbourhood socioeconomic context and health outcomes: a critical review. *J Epidemiol Community Health*. 2001 Feb; 55(2):111-22.
18. Sellström E, Bremberg S. The significance of neighbourhood context to child and adolescent health and well-being: a systematic review of multilevel studies. *Scand J Public Health*. 2006; 34(5):544-54.
19. Macintyre S, Ellaway A, Cummins S. Place effects on health: how can we conceptualise, operationalise and measure them? *Soc Sci Med*. 2002 Jul; 55(1):125-39.
20. Borrell LN, Burt BA, Warren RC, Neighbors HW. The role of individual and neighborhood social factors on periodontitis: the third National Health and Nutrition Examination Survey. *J Periodontol*. 2006 Mar; 77(3):444-53.
21. Heise LL. Violence against women: an integrated, ecological framework. *Violence Against Women*. 1998 Jun; 4(3):262-90.
22. Link BG, Phelan J. Social conditions as fundamental causes of disease. *J Health Soc Behav*. 1995; Spec No:80-94.
23. Bronfenbrenner U. *The ecology of human development*. Cambridge, MA: Harvard University Press, 1979.
24. Merlo J, Chaix B, Yang M, Lynch J, Rastam L. A brief conceptual tutorial of multilevel analysis in social epidemiology: linking the statistical concept of clustering to the idea of contextual phenomenon. *J Epidemiol Community Health*. 2005 Jun; 59(6):443-9.
25. Houck CD, Nugent NR, Lescano CM, Peters A, Brown LK. Sexual abuse and sexual risk behavior: beyond the impact of psychiatric problems. *J Psychiatr Psychol*. 2010 Jun; 35(5): 473-83.
26. Harries K. Ecology of homicide and assault: Baltimore city and country, 1989-1991. *Stud Crime Crime Prev*. 1995; 4(1):44-60.
27. Browning CR. The span of collective efficacy: extending social disorganization theory to partner violence. *J Marriage Fam*. 2002; 64(4):833-50.
28. Hirschi T. *Causes of delinquency*. Berkeley and Los Angeles: University of California Press, 1969.
29. Sutherland EH. *Principles of Criminology*. 6th ed. Philadelphia: Lippincott, 1960.
30. Church II WT, Jagers JW, Taylor JK. Neighborhood, poverty, and negative behavior: an examination of differential association and social control theory. *Child Youth Serv Rev*. 2012; 34(5):1035-41.
31. DHS. Publications by country. 2010, [www.measuredhs.com/pubs/browse\\_region.cfm](http://www.measuredhs.com/pubs/browse_region.cfm), accessed 5 March 2012.
32. Macro O, Calverto M. *Demographic and health survey interviewer's manual*. U S A :ORC Macro, 2006.
33. Gwatkin DR, Rutstein S, Johnson K, Suliman E, Wagstaff A, Amouzou A. *Socio-economic differences in health, nutrition and population*. Washington, D.C: The World Bank, 2007.

34. DHS+ Dimensions. A semiannual newsletter of the Demographic and Health Surveys project. 2002,<http://www.measuredhs.com/pubs/pdf/NL42/Vol4nos2.pdf>, accessed 5 May 2012.
35. Snijders T, Bosker R. Multilevel analysis: an introduction to basic and advanced multilevel modelling. 2nd ed. Newbury Park: SAGE publications, 1999.
36. Center of Multilevel Modelling, Institute of Education, University of London. A user's guide to MLwin. London: Center of Multilevel Modelling, Institute of Education, University of London, 2008.
37. Edgardh K, Ormstad K. Prevalence and characteristics of sexual abuse in a national sample of Swedish seventeen-year-old boys and girls. *Acta Paediatr*. 2000; 89(3):310-9.
38. Goldman JD, Padayachi UK. The prevalence and nature of child sexual abuse in Queensland, Australia. *Child Abuse Negl*. 1997 May; 21(5):489-98.
39. Anderson J, Martin J, Mullen P, Romans S, Herbison P. Prevalence of childhood sexual abuse experiences in a community sample of women. *J Am Acad Child Adolesc Psychiatry*. 1993 Sep; 32(5):911-9.
40. Chen J, Dunne MP, Han P. Child sexual abuse in China: a study of adolescents in four provinces. *Child Abuse Negl*. 2004 Nov; 28(11):1171-86.
41. Noll JG, Trickett PK, Harris WW, Putnam FW. The cumulative burden borne by offspring whose mothers were sexually abused as children: descriptive results from a multi-generational study. *J Interpers Violence*. 2009 Mar; 24(3):424-49.
42. Chavez Ayala R, Rivera-Rivera L, Angeles-Llerenas A, Diaz-Ceron E, Allen-Leigh B, Ponce EL. Factors for sexual abuse during childhood and adolescence in students of Morelos, Mexico. *Rev Saude Publica*. 2009 Jun; 43(3):506-14.
43. Trickett PK, Noll JG, Putnam FW. The impact of sexual abuse on female development: Lessons from a multigenerational, longitudinal research study. *Dev Psychopathol*. 2011 May; 23(2):453-76.
44. Curtis GC. Violence breeds violence - Perhaps? *Am J Psychiatry*. 1963 Oct; 120:386-7.
45. Richardson D. The effects of a false allegation of child sexual abuse on an intact middle class family. *Issues in Child Abuse Accusations*. 1990; 2(4):226-38.
46. Finkelhor D. *Child sexual abuse: new theory and research*. First ed. New York: Free press, 1984.